Figure 1 provides a flow diagram identifying the major processes involved in container reconditioning. The paragraphs below provide a brief description of each major process.

**Container Receiving -** Used, empty containers are received from suppliers via tractor trailer. Shipping may be arranged by the supplier or by ICS, and containers may be transported using ICS-owned equipment, supplier-owned equipment, common carrier or contract carrier. Each ICS facility maintains a fleet of tractors and trailers for container transportation. As required by USEPA and USDOT regulations, shipments of empty containers are received with all closures in place. Closures remain in place until the containers enter the cleaning process.

**Open Head Steel Drum Cleaning -** Empty open head steel drums are cleaned by processing in a Drum Reclamation Furnace. After the heads are removed, drums are placed on a conveyor that moves through the primary chamber of the tunnel-design furnace. Fired with natural gas or fuel oil, the furnace primary chamber operates at a temperature of 1200 to 1500 °F. Any residual material on the interior of the drum is combusted within the primary chamber. Protective coatings on the exterior and interior surfaces of the drum are burned to a friable condition so that they may be easily removed through shot blasting.

Combustion gases generated within the primary furnace chamber are ducted to a thermal oxidizer chamber for air pollution control. The thermal oxidizer is fired with natural gas and typically operates at 1500 to 1800 °F. Where facility operations require steam for other processes, exhaust gases exiting the thermal oxidizer may be ducted to a waste heat boiler for steam generation.

The Drum Reclamation Furnace generates a non-hazardous solid waste stream in the form of ash. This material is typically transported for offsite disposal at a municipal or commercially operated landfill.

**Closed Head Steel Drum, Plastic Drum and IBC Cleaning -** Empty closed head steel drums, plastic drums and IBCs are cleaned with hot water and/or a caustic (sodium hydroxide) solution in a staged, conveyorized wash process. Wash water from this process is reused to the greatest extent possible to minimize wastewater generation. Wastewater may be discharged to a local Publicly Owned Treatment Works (POTW), transported offsite to a commercial disposal facility. Where wash operations are located along with a Drum Reclamation Furnace, wastewater may be reused to supplement the demand for furnace chain cooling water.

**Steel Drum Surface Preparation and Repair -** After open head and closed head steel drums are cleaned either through a Drum Reclamation Furnace or wash process, they are shot blasted to prepare the metal surface for repainting. The enclosed, automated blasting machines operate with recirculated steel shot, supplemented with a makeup supply of fresh steel shot. This process generates a non-hazardous solid waste stream in the form of dust. The dust consists of spent shot along with the pulverized coatings removed from the drum surface. This material may be transported offsite for recycling as scrap steel, or for disposal at a municipal or commercially operated landfill.

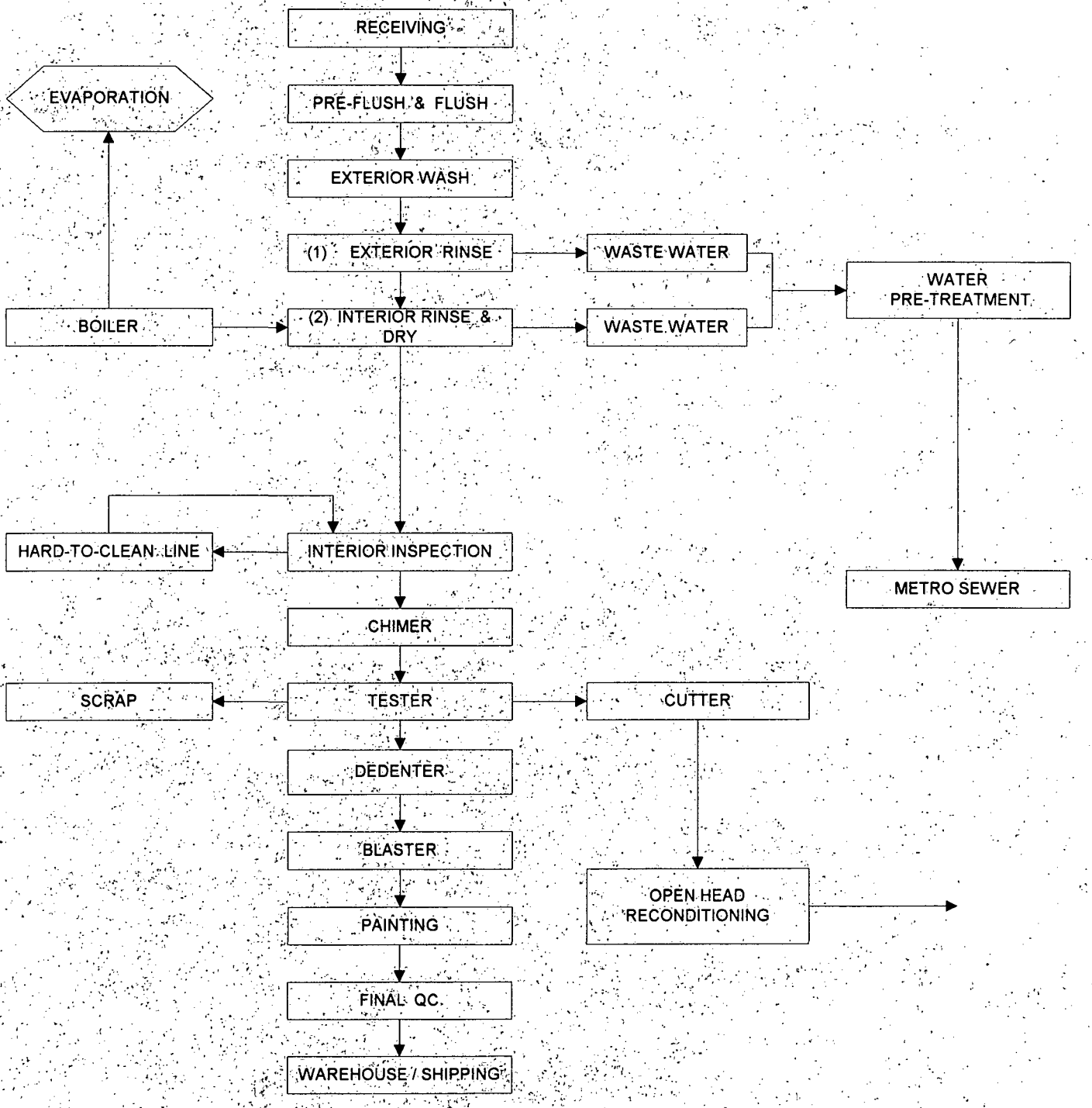
After shot blasting, steel drums are reshaped and repaired using a variety of specialized metal working machines. These unit processes are designed to restore the physical condition of the drum to meet its original specifications, or to change the physical configuration to a different design type. Steel drums offered for packaging hazardous materials must meet USDOT and UN regulatory requirements.

**Steel Drum Surface Coating and Assembly -** After surface preparation and repair, steel drums are painted according to customer specifications. A protective coating is applied to the drum exterior, and if required a chemically resistant or food grade lining may be applied to the drum

interior. After painting, the drum body is assembled with the appropriate lid, ring and/or bung and plug fittings as required by the customer. USDOT and UN required labels and/or stencils are applied, and the drums are staged for shipping.

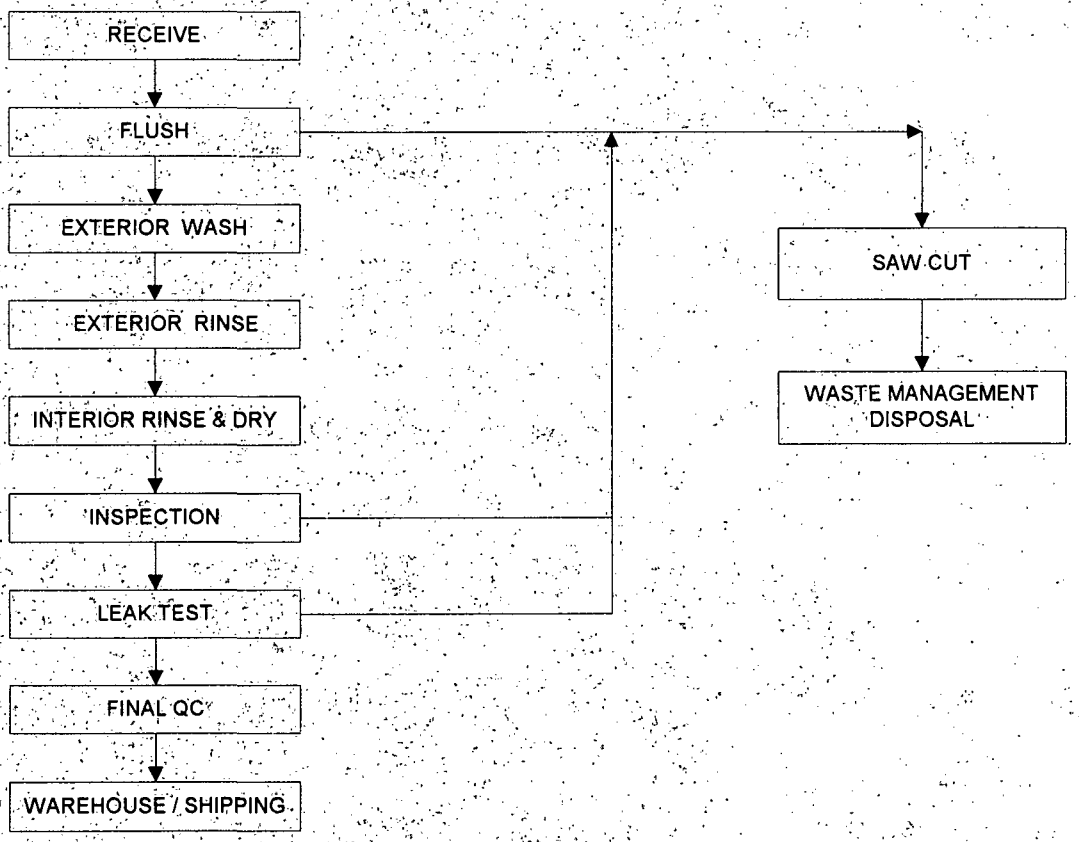
**Container Shipping** - Reconditioned containers, as well as new containers distributed by ICS facilities, are shipped to customers via tractor trailer. Shipping may be arranged by the supplier or by ICS, and containers may be transported using ICS-owned equipment, supplier-owned equipment, common carrier or contract carrier. Each ICS facility maintains a fleet of tractors and trailers for container transportation.

# TIGHT HEAD RECONDITIONING PROCESS FLOW DIAGRAM

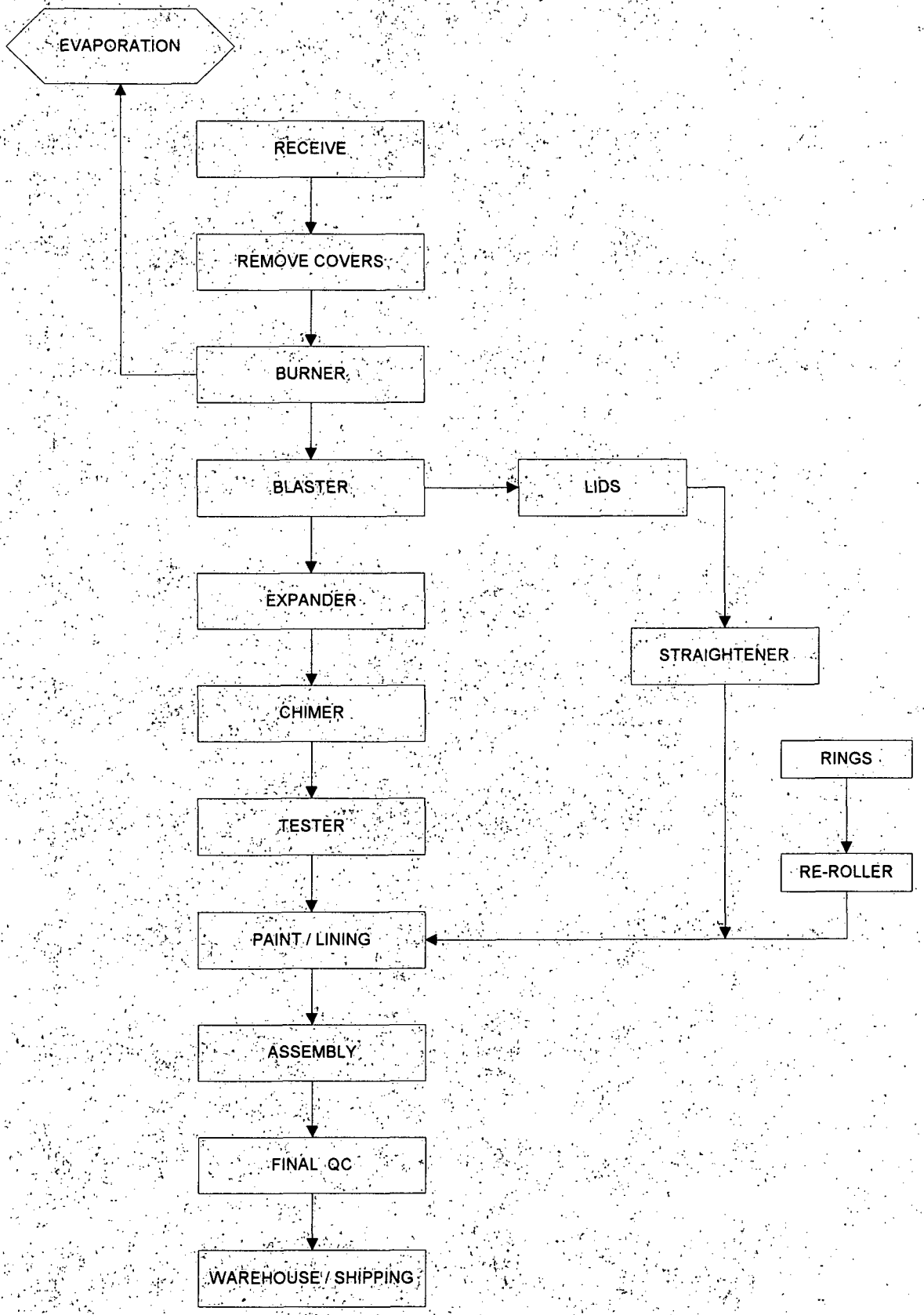



(1) (2) - A PROCESS THAT GENERATES WASTE WATER

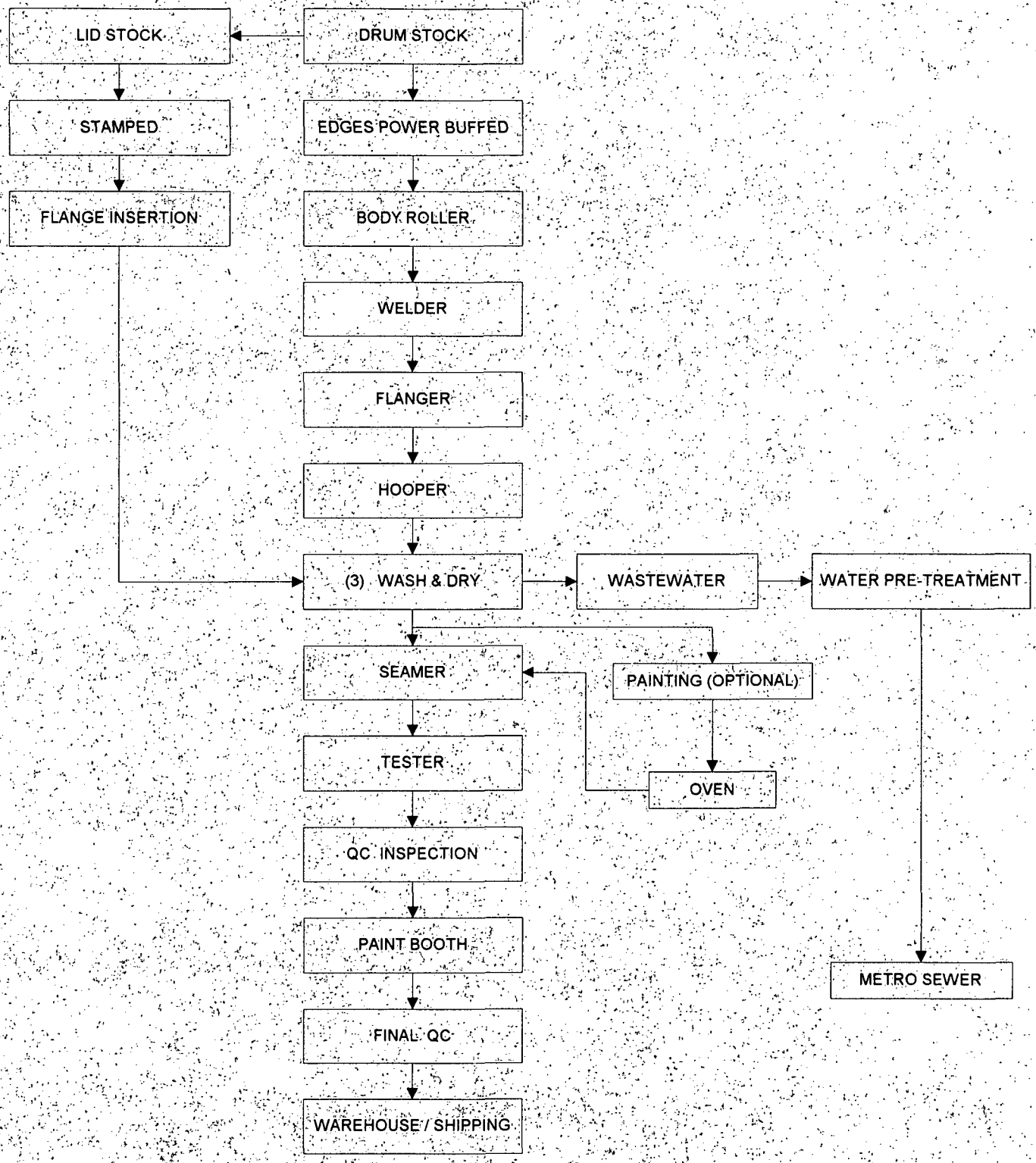
# POLY DRUM (PLASTIC) PROCESS FLOW DIAGRAM



# OPEN HEAD RECONDITIONING PROCESS FLOW DIAGRAM



# NEW DRUM PRODUCTION FLOW DIAGRAM




(3) A PROCESS THAT GENERATES WASTE WATER